Guest Lecture

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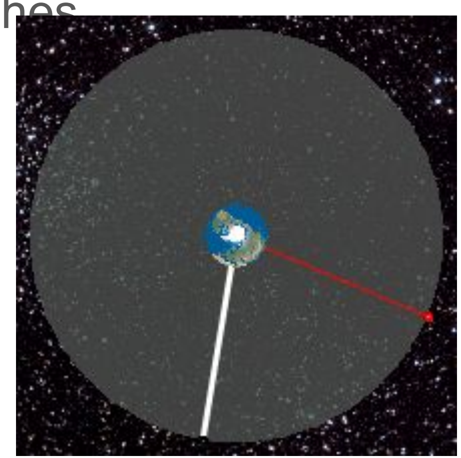
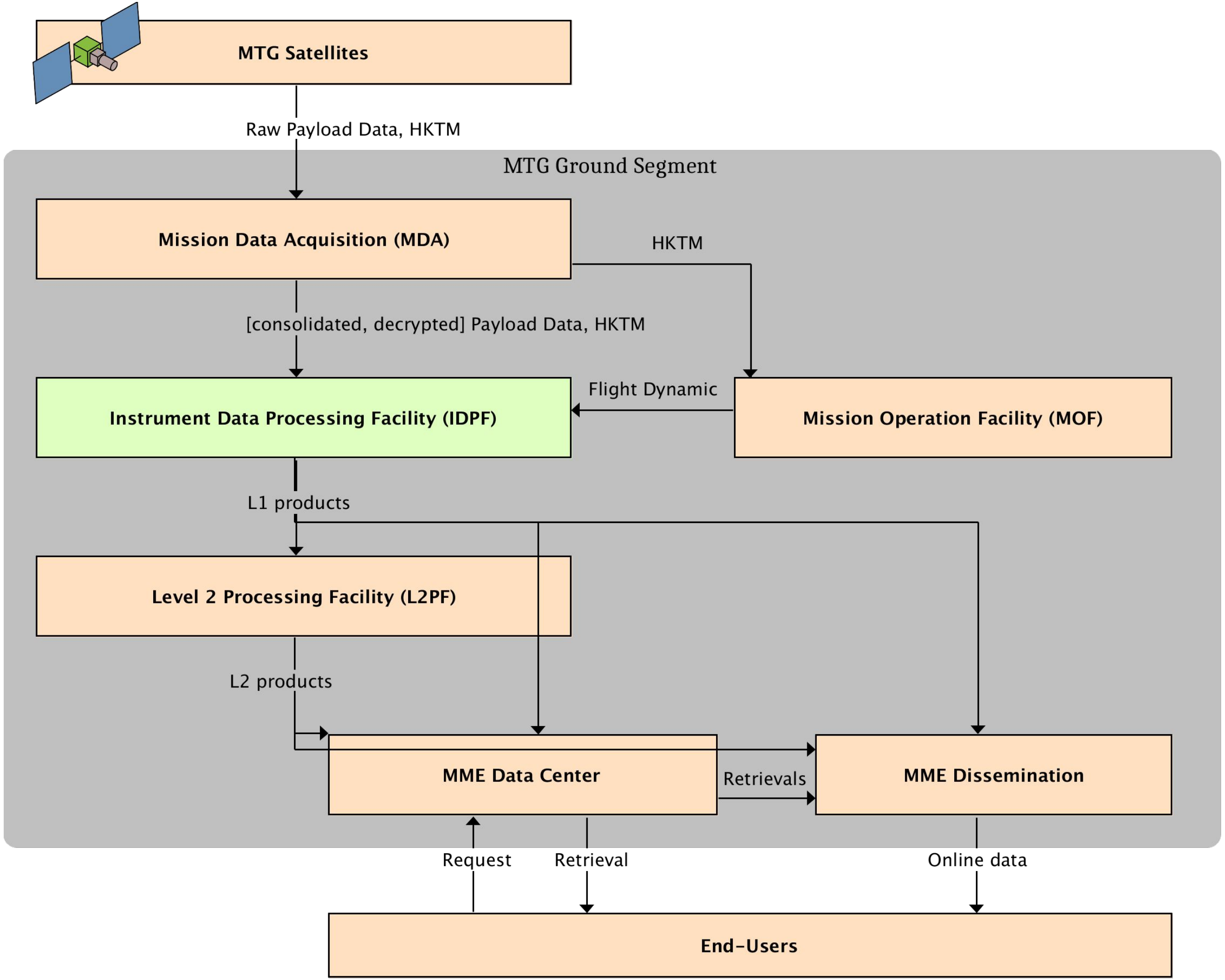
Meteosat Third Generation

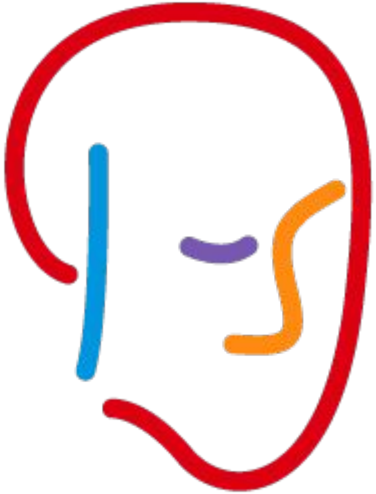
About Project

- The existing program MSG is at the end of its lifetime
- Motivation to better monitor Severe Storms and Air Quality
- InfraRed Sounder Satellite monitors Atmosphere
- Flexible Combined Imager Instrument monitors Land/Water Surfaces
- Lightning Imager Instrument monitors Lightning Flashes
- Monitoring is done in real-time or near real-time




MTG Satellites
Raw Payload Data, HKTM
MTG Ground Segment
Mission Data Acquisition (MDA)
HKTM
[consolidated, decrypted] Payload Data, HKTM
Flight Dynamic
Instrument Data Processing Facility (IDPF)
Mission Operation Facility (MOF)
L1 products
Level 2 Processing Facility (L2PF)
L2 products
MME Data Center
Retrievals
MME Dissemination
Request
Retrieval
Online data
End-Users

Technology stack



Corporate Environment

- You get a mentor if you are new and a lot of perks
- You work in an international environment
- You can work on a huge and cool project (i.e. program LISA)

- Career paths are set and can lead you to management
- The standards you set on yourself might not align with company values
- You spend time in meetings and some bureaucracy

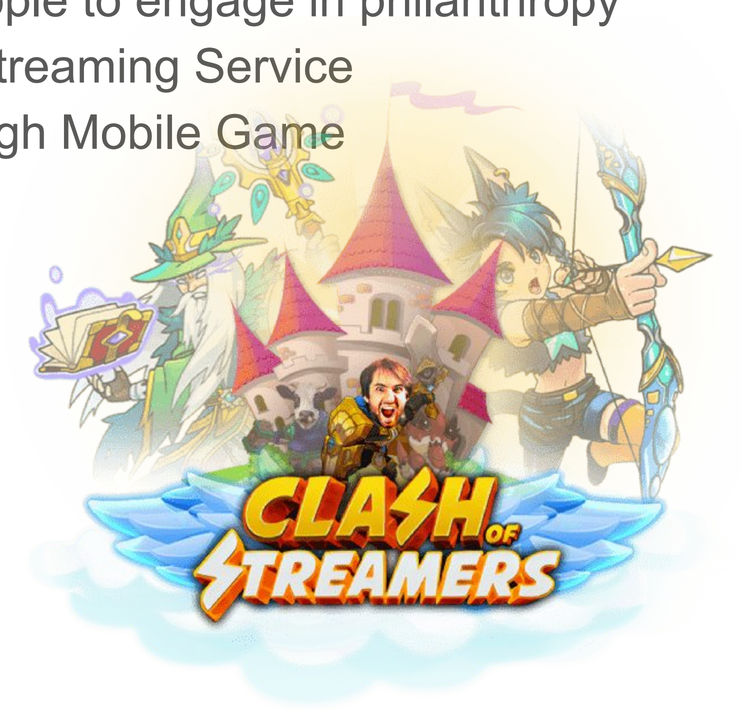
Learning Sources

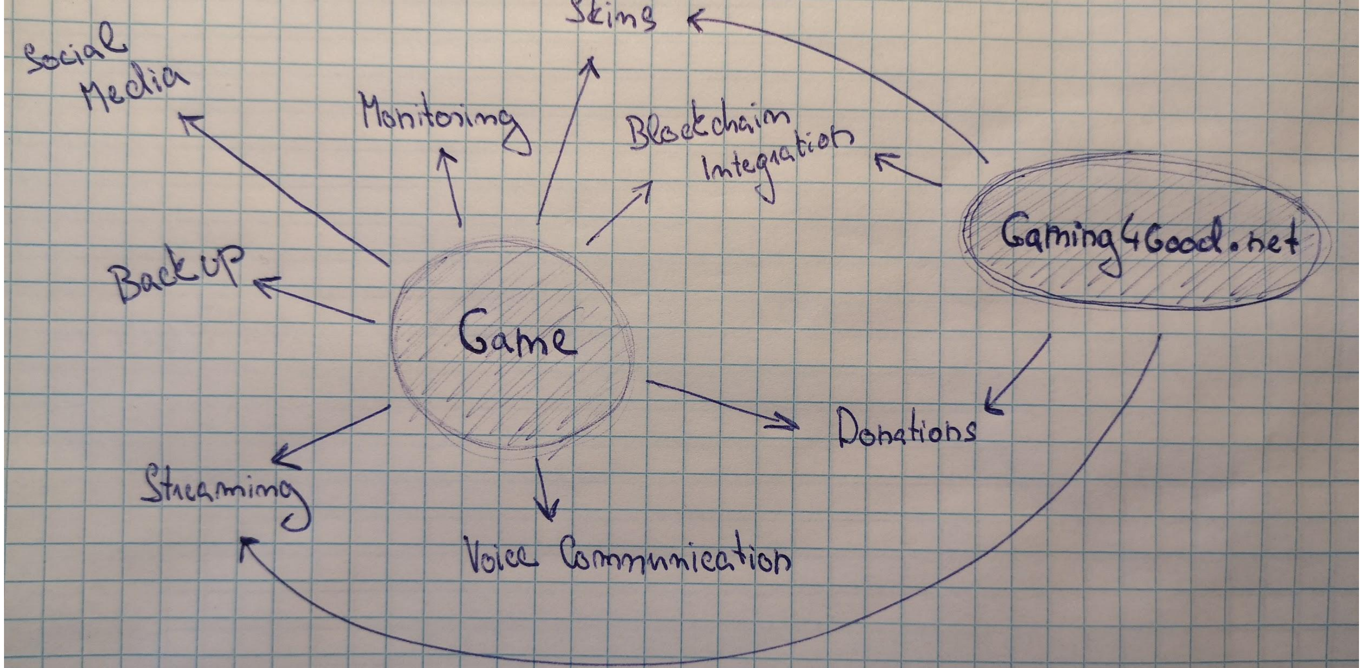
- Effective C++, Third Edition, 2005
- Effective Modern C++, 2014
- Effective STL, 2001
- Head First Design Patterns: A Brain-Friendly Guide, 2004
- https://beej.us/guide/bgnet/

The Singularity Group

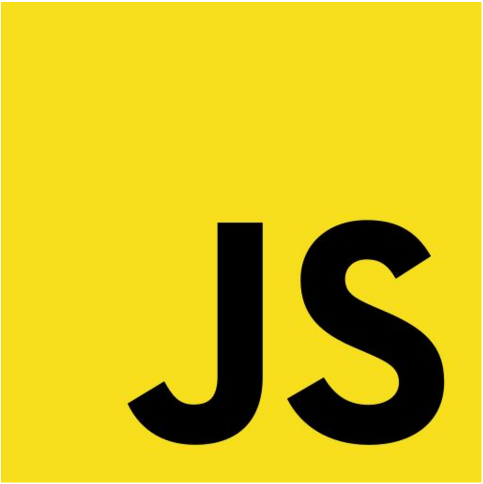
About Project

- Motivation to involve more people in charity activities through gaming
- Motivation to develop UBI token to allow people to engage in philanthropy
- Gaming4Good charity fundraising through Streaming Service
- Clash of Streamers charity fundraising through Mobile Game
- DubiEx exchange not only for the UBI token




Social Media
Monitoring
Skins
Blockchain Integration
Back UP
Game
Gaming4Good.net
Donations
Streaming
Voice Communication

Technology stack



Startup Environment

- You are on your own and have sole responsibility
- You are evaluated purely by your skill
- Environment full of dedicated people

- Working on immediate problems (for us technology driven)
- You tend to spend most of your time at work
- You can get paid indirectly

Learning Sources

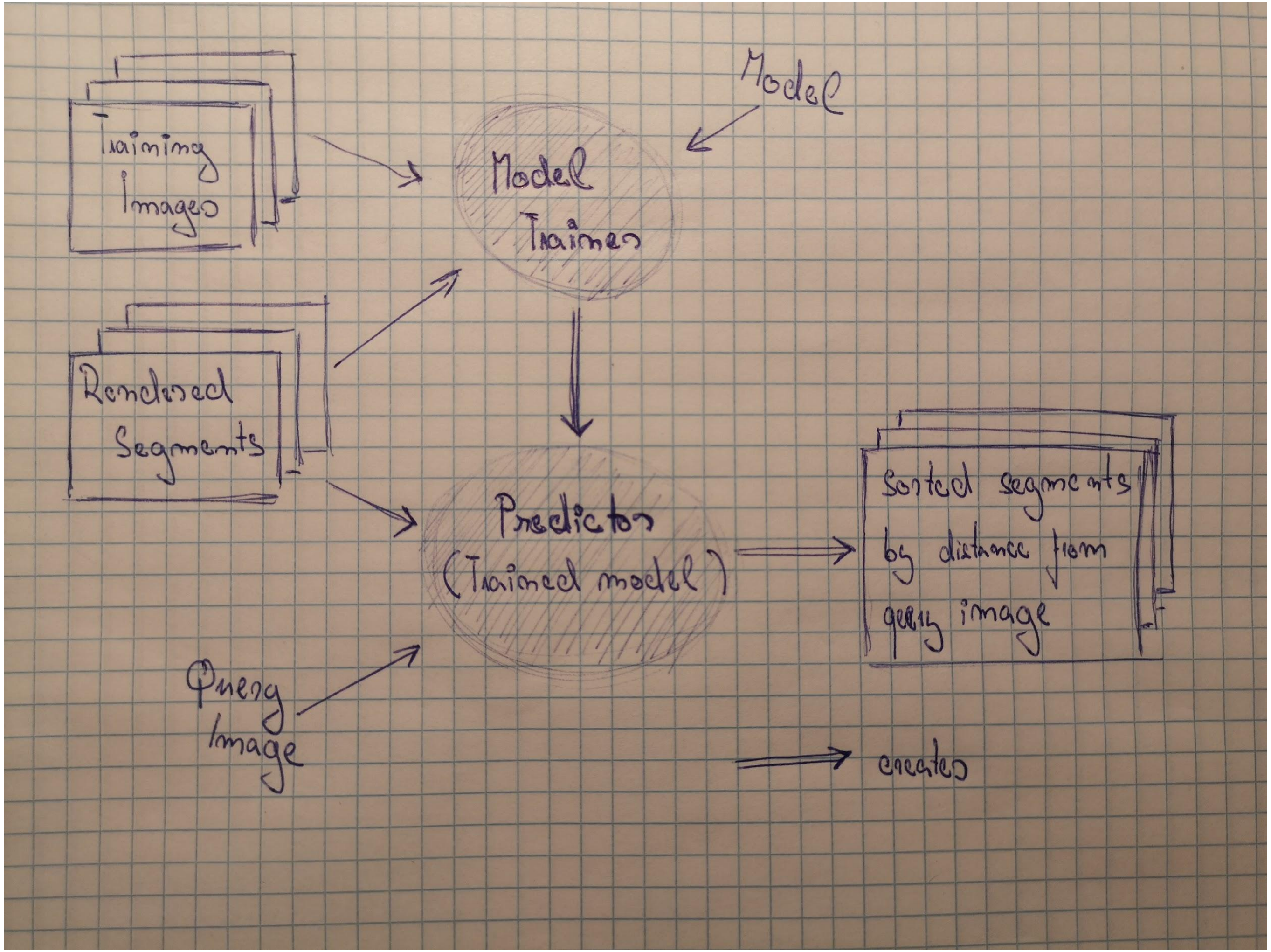
- Effective Python: 59 Specific Ways to Write Better Python, 2015
- Functional JavaScript, 2013
- Clojure Applied, 2015
- https://clojure.org/api/cheatsheet

Doctor Studies - CPhoto@FIT

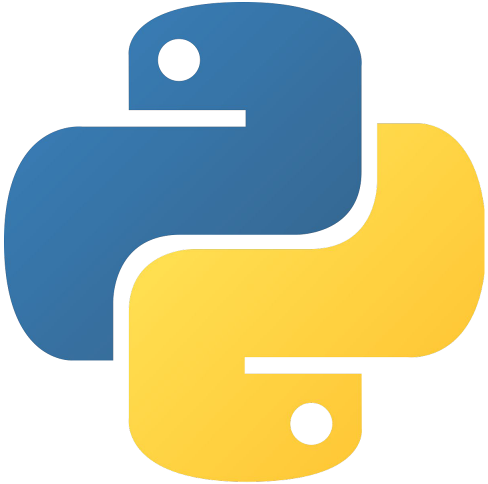
About Project

- Motivation to extract visual cues from photography for localization
- Motivation to improve terrain generation and rendering
- Possibilities of placing person into virtual reality when location is known
- Possibilities of enhancing the photographs when location is known
- Possibilities for object labeling when location is known

CPhoto@FIT


Training Images
Model
Model Trainer
Rendered Segments
Predictor (Trained model)
Sorted segments by distance from query image
Query Image
creates

Technology stack



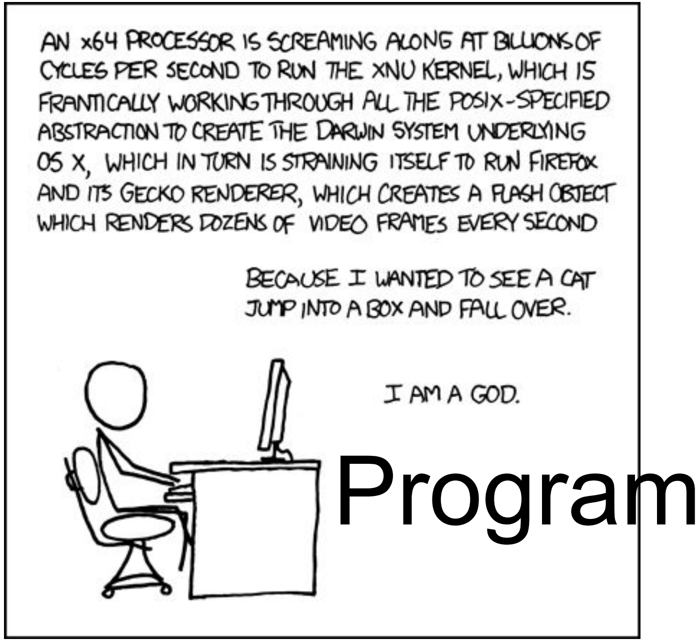
University Environment

- Safe environment for doing interesting work
- Great environment for meeting interesting people and making collaborations
- Freedom to use any technology/programming language
- Not so stressful like in startup

- You spend some time on bureaucracy
- You have to be driven yourself

Learning Sources

- Dota 2 with Large Scale Deep Reinforcement Learning (paper)
- AlphaStar: Grandmaster level in StarCraft II using multi-agent reinforcement learning (paper)
- The Quake III Arena Bot (paper)


AN x64 PROCESSOR IS SCREAMING ALONG AT BILLIONS OF CYCLES PER SECOND TO RUN THE XNU KERNEL, WHICH IS FRANTICALLY WORKING THROUGH ALL THE POSIX-SPECIFIED ABSTRACTION TO CREATE THE DARWIN SYSTEM UNDERLYING OS X, WHICH IN TURN IS STRAINING ITSELF TO RUN FIREFOX AND ITS GECKO RENDERER, WHICH CREATES A FLASH OBJECT WHICH RENDERS DOZENS OF VIDEO FRAMES EVERY SECOND
BECAUSE I WANTED TO SEE A CAT JUMP INTO A BOX AND FALL OVER.
I AM A GOD.

Programming Abstractions

Taken from: https://xkcd.com/676/

Frameworks

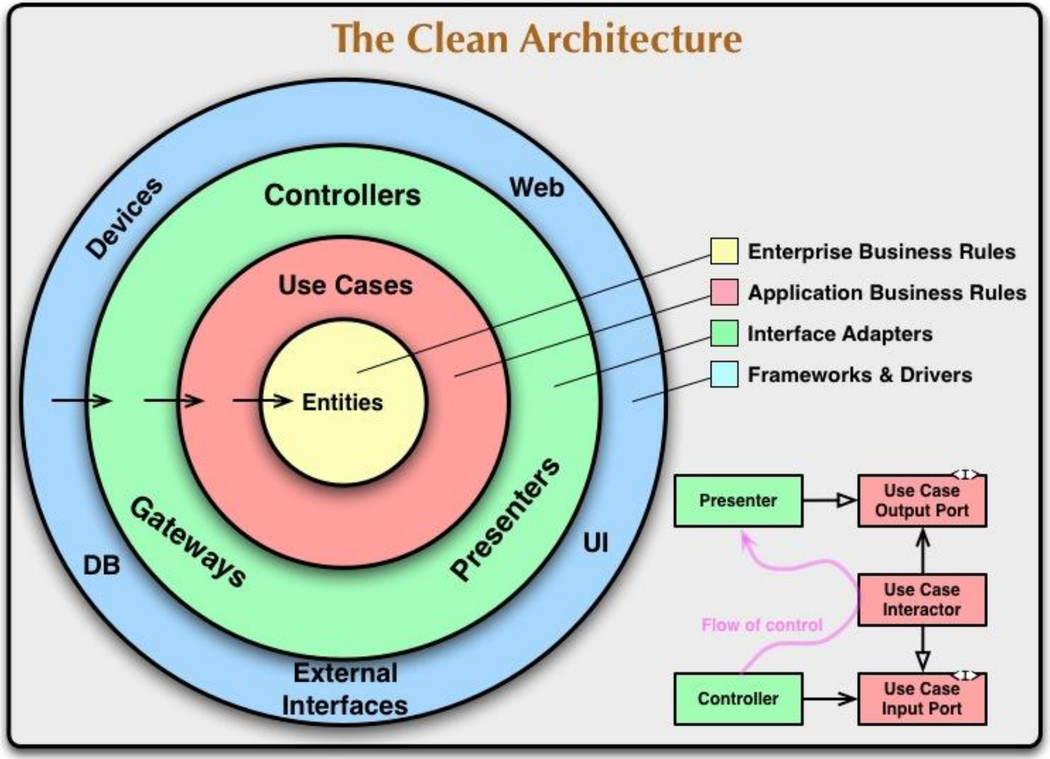
- You have no control over it, be aware of that
- Your software may outgrow a framework
- Your software might evolve in different direction
- You might want to switch to better framework

- Try to make framework plugin to your program
  - Possible to use proxy objects when needing to inherit from framework classes
- But it is only a recommendation not a rule (C++ STL, Clojure contrib, …)

Databases

- Similar things like a framework, you don’t have a control over them
- How you store data in a database is a detail to your application
- Data model is best done when you have identified all Entities and their relations
- With growing amount of RAM content based search might no longer need DB

- Start designing your application around Use Cases and Entities not Frameworks
- Try to make these as plugins to your program as well
- The same applies for HTTP Servers, Device Drivers, UI Frameworks…



Taken from:
https://blog.cleancoder.com/uncle-bob/2012/08/13/the-clean-architecture.html
SOLID principles: https://en.wikipedia.org/wiki/SOLID

DIAGRAM PROGRAMU ZA BĚHU

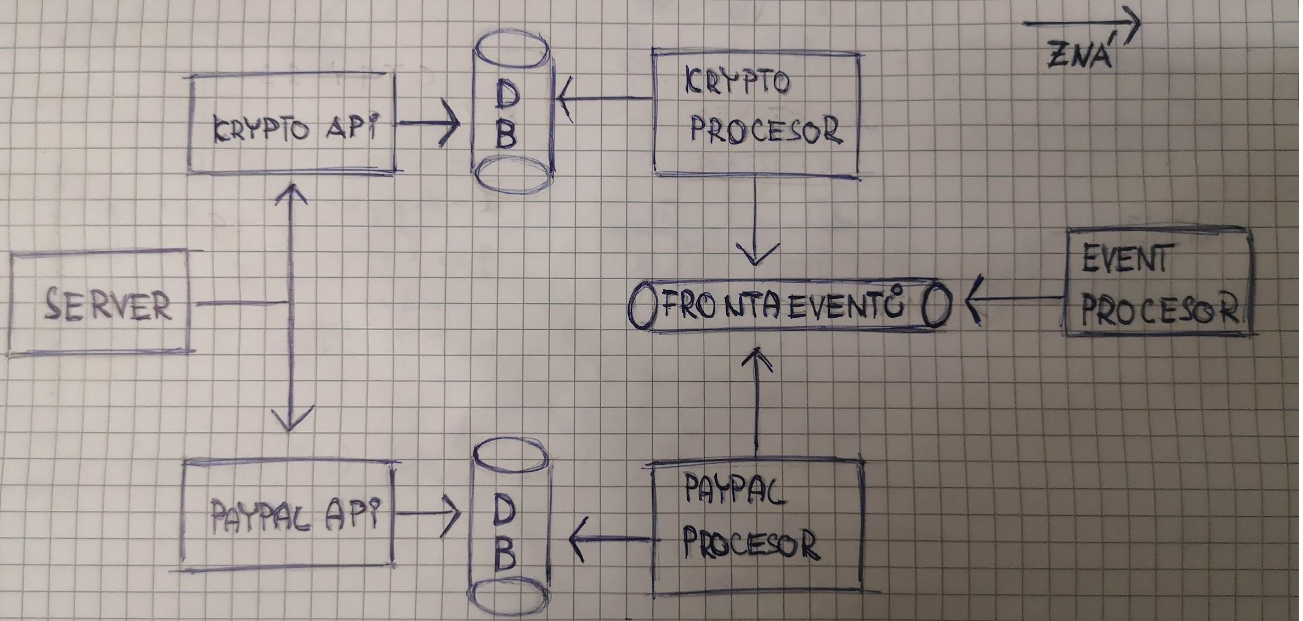
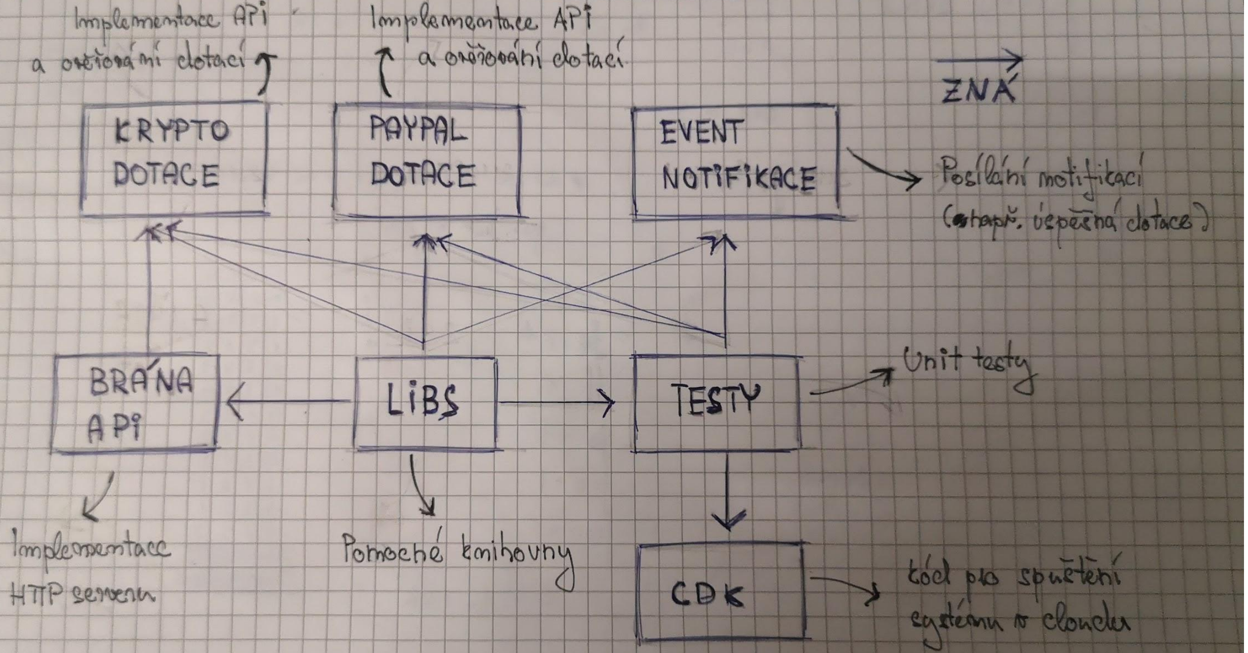
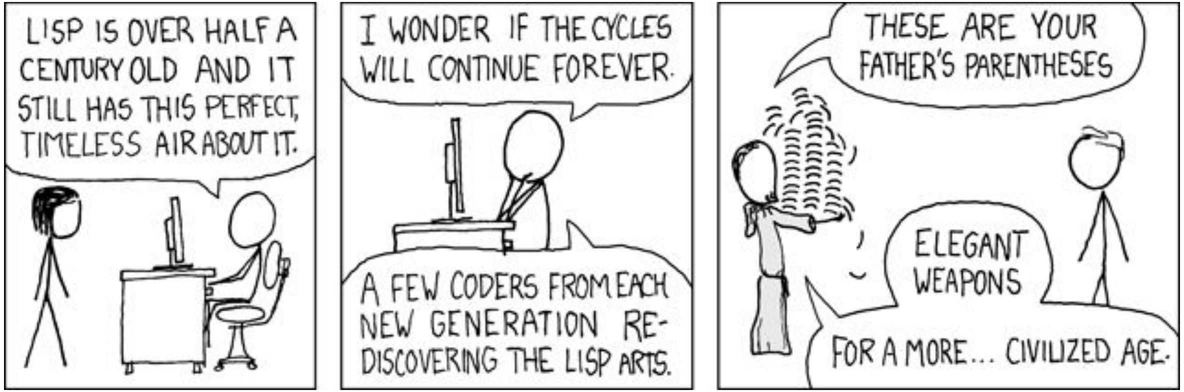


DIAGRAM ZDROJOVÉHO KÓDU PROGRAMU


Implementace API a ověřování dotací
Implementace API a ověřování dotací
ZNÁ
KRYPTO DOTACE
PAYPAL DOTACE
EVENT NOTIFIKACE
Posílání notifikací (např. úspěšná dotace)
BRÁNA API
LIBS
TESTY
Unit testy
CDK
Implementace HTTP serveru
Pomocné knihovny
Kód pro spuštění systému v cloudu


LISP IS OVER HALF A CENTURY OLD AND IT STILL HAS THIS PERFECT, TIMELESS AIR ABOUT IT.
I WONDER IF THE CYCLES WILL CONTINUE FOREVER.
A FEW CODERS FROM EACH NEW GENERATION RE-DISCOVERING THE LISP ARTS.
THESE ARE YOUR FATHER'S PARENTHESES
ELEGANT WEAPONS
FOR A MORE... CIVILIZED AGE.

Language Abstraction

Taken from: https://xkcd.com/297/

Experiment with Languages

- Languages vary in power - you don’t write today in assembler
- Different languages provide different set of primitives
- Some allows you to easily reprogram compiler (i.e. LISP macros)
- Some are domain specific (i.e. Tidal for music coding)

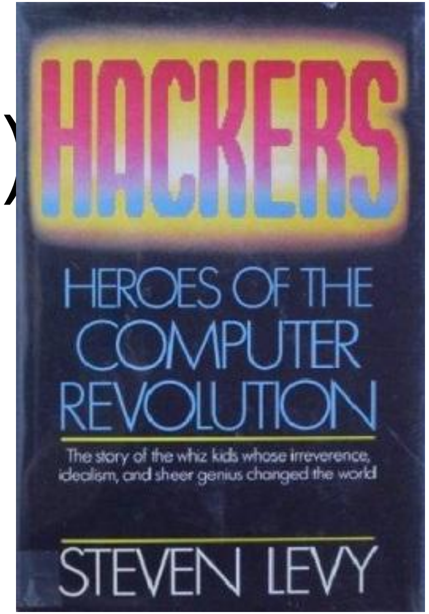
- This matters in fast moving and competitive areas
- WhatsApp/Instagram all started with non-industrial languages (Erlang, Python)
- Scaling to the Next Level at WhatsApp (Rick Reed, video)

Fortress Language Project

- What would be relevant programming primitives going to the future
- Focus on parallelism with goal to manage CPU resources automatically
- Develop a new consensus to use those primitives in everyday programming
- It is based on math notation (uses unicode characters i.e. ∑)

- Fortress Features and Lessons Learned (Guy Steele, video)
- Simple Made Easy (Rich Hickey, video)

Thank you for listening! :)



HACKERS

HEROES OF THE COMPUTER REVOLUTION

The story of the whiz kids whose irreverence, idealism, and sheer genius changed the world

STEVEN LEVY

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